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HHMI Grants Connect Research Institutions with Local Schools: Highlights of Selected Programs

Virginia is for science lovers As researchers generate vast quantities of data about individual genes, proteins, and signaling pathways, scientists are realizing that true understanding of complex biological systems requires studying how these components work together. By focusing on the cell or organism as a whole, rather than merely the sum of its parts, systems biologists hope to open new avenues to understanding, preventing, and treating disease. To help train future scientists to think like systems biologists, Virginia Commonwealth University (VCU) in Richmond is taking a similarly integrated approach. It will use its \$750,000 grant from HHMI to implement programs targeting teachers, community members, and students at many educational levels. Graduate students and postdoctoral fellows will introduce kindergarten through 12th grade science teachers to research techniques in workshops highlighting applied systems biology. This training will help teachers create activities that encourage students to design and conduct their own scientific inquiries. The HHMI grant will also support development of a systems biology component to VCU's popular "Secrets of the Sequence" public education campaign, through which educators can download videos and accompanying lesson plans and activities.

Purdue offers to bring the laboratory to you If you think back on your middle school days, can you remember what experience most captured your attention and inspired you to learn more? For many, field trips come to mind first because they are an engaging way to experience subjects discussed in the classroom. But not all schools have the resources needed to support traditional field trips. Soon, however, students in rural Indiana will be able to immerse themselves in a laboratory setting and interact with working scientists—without ever having to get on a school bus or even leave the classroom. Electronic field trips eliminate the time and expense needed to transport students to another location by bringing the location to them—online. The first veterinary school to be funded by HHMI, the Purdue University School of Veterinary Medicine in Lafayette, Indiana will use its \$749,755 grant to create electronic field trips on topics of interest to middle school students, such as comparative biology, which focuses on the evolutionary and biological relationships between different species. Purdue is targeting students in grades 6 through 8 because middle school is considered

an especially crucial time to nurture children's interest in science. Purdue faculty members hope to capture students' attention with live demonstrations and experiments, videos and animations of scientific processes, and opportunities for students to interact directly with working scientists.

Help yourSELF to some science Elementary school teachers in Houston, Texas, are getting a taste of what it's like to be a scientist. The Baylor College of Medicine's SELF (Science Education Leadership Fellows) program pairs experienced science teachers -- many from schools in economically disadvantaged areas -- with Baylor postdoctoral researchers and graduate students to form science education improvement teams. The teams learn and teach together, exploring innovative ways to introduce research to children at an early age. Teachers learn laboratory methods through hands-on experience and conduct a three-week summer research project. Scientists have opportunities to work directly with students, observing and teaching in classrooms. SELF teachers make the knowledge they've gained available to all Houston teachers via online virtual workshops, and dozens of program alumni are now leading teacher professional development all over the nation. The program, which has been supported by two previous outreach grants from HHMI, already has demonstrated remarkable success. For example, one SELF school saw its students' success on the science portion of the Texas Assessment of Knowledge and Skills rise from 28 percent to 82 percent after just one year of participation in the program. The new \$749,627 grant will help SELF continue and expand.

Surf's up in biomedical careers Homework is not the first thing on a middle school student's agenda. To make sure the work gets done on time, it often takes the gentle and constant reminders of parents. But what if your parents each work more than one job, and don't even speak the language that the homework assignment is written in? This is the case for many Native Hawaiian and Pacific Islander students in Hawaii, who are noticeably absent from rigorous science courses in high school and college. Scientists at The Queen's Medical Center in Honolulu suspect that lack of family support is one reason these students are drastically underrepresented in biomedical careers. With a grant totaling \$747,644, Queen's plans to encourage Native Hawaiian and Pacific Islanders to pursue careers in biomedicine. A series of health science evenings will bring students, their families and their teachers together with biomedical professionals with diverse ethnic and cultural backgrounds. A typical evening might include hands-on research activities and discussions of biomedical careers and resources available to help students prepare for such careers. To increase family involvement, onsite childcare and transportation costs will be provided. This family outreach effort is part of a larger program that will provide middle school students with mentors in the biomedical professions and hands-on activities. Additionally, teachers will receive educational resources and professional development to help them introduce interactive lessons and problem-based learning into their classrooms. By showing students that careers in the biomedical sciences are attainable, and at the same time getting their families involved, Queen's hopes to improve health literacy and increase enrollment of

minorities in biomedical training programs.

Hope floats for health education Smithville, a rural Texas town between Austin and Houston, prides itself on being the setting of the 1998 film “Hope Floats.” But soon, Smithville will pride itself on a new dedication to health and scientific education. With a \$750,000 grant from HHMI, the University of Texas M.D. Anderson Cancer Center's Science Park Research Division, located in nearby Bastrop County, will launch CENTIPEDe (Community Education Networks To Integrate Prevention of Environmental Disease). Through CENTIPEDe, the Science Park Research Division will help Smithville schools overcome the limited access to scientific expertise and educational resources that are a common challenge for rural communities. Teachers will be selected to participate in a six-week fellowship where they will spend time exploring cutting-edge research techniques in M.D. Anderson laboratories. As part of their fellowship, teachers will develop education materials that will be shared with students and teachers throughout the district. High school students will benefit from the Lab Rats program, through which graduate students and postdoctoral fellows will provide a mentored research experience. Other Smithville residents will be drawn in through twice yearly Community Science Nights. Through student presentations, demonstrations, and panel discussions led by M.D. Anderson researchers, the program will bring relevant health information (such as cancer prevention or stem cell research) to community members in an accessible, engaging way. To broaden its impact, M.D. Anderson will advertise and disseminate Community Science Nights to the public online, through public access television, and on Spanish language radio programs.